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AFRL-SR-BL-TR-01-

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or reducing this burden to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503

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<b>1. AGENCY USE ONLY (Leave blank)</b>		<b>2. REPORT DATE</b> March 6, 2000	<b>3. REPORT TYPE AND DATES COVERED</b> Final Report, 6/01/98 - 5/31/99	
<b>4. TITLE AND SUBTITLE</b> Acquisition of an Inert Atmosphere Dry Box			<b>5. FUNDING NUMBERS</b> F49620-98-1-0449	
<b>6. AUTHOR(S)</b> Kraig A. Wheeler				
<b>7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</b> Delaware State University 1200 N. DuPont Hwy Dover, DE 19901			<b>8. PERFORMING ORGANIZATION REPORT NUMBER</b> NA	
<b>9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)</b> AFOSR/PKC 801 N. Randolph St., Rm. 732 Arlington, VA 22203-1977			<b>10. SPONSORING / MONITORING AGENCY REPORT NUMBER</b>	
<b>11. SUPPLEMENTARY NOTES</b>				
<b>12a. DISTRIBUTION / AVAILABILITY STATEMENT</b> No restriction to distribution				
<div style="text-align: right;"> <p><b>20010521 176</b></p> <p>AIR FORCE OFFICE OF SCIENTIFIC RESEARCH (AFOSR) NOTICE OF TRANSMITTAL DTIC. THIS TECHNICAL REPORT HAS BEEN REVIEWED AND IS APPROVED FOR PUBLIC RELEASE LAW AFR 190-12. DISTRIBUTION IS UNLIMITED.</p> </div>				
<b>13. ABSTRACT (Maximum 200 Words)</b> The acquisition of a Vacuum/Atmospheres NX1-211000 dry box has greatly strengthened the existing research programs in electrochemistry and materials science at Delaware State University (DSU). This instrumentation has equipped DSU with essential infrastructure support to aid researchers, as well as, provide a hands-on teaching resource for student research assistants (undergraduate and graduate) in the synthesis and manipulation of air-sensitive materials. The equipment has been utilized in research programs directed towards the study of advanced materials. Specifically these programs focus on the design and synthesis of non-linear optical materials and lithium rechargeable batteries supported by The Air Force Office of Scientific Research and The Department of Energy, respectively. The capabilities of the new instrument has allowed areas of research not previously explored at DSU, at the same time advancing the quality of research related instruction at DSU.				
<b>14. SUBJECT TERMS</b> FY 98 DOD HBCU/MI Infrastructure Support Program			<b>15. NUMBER OF PAGES</b> 4	
			<b>16. PRICE CODE</b>	
<b>17. SECURITY CLASSIFICATION OF REPORT</b> UNCLASSIFIED	<b>18. SECURITY CLASSIFICATION OF THIS PAGE</b> UNCLASSIFIED	<b>19. SECURITY CLASSIFICATION OF ABSTRACT</b> UNCLASSIFIED	<b>20. LIMITATION OF ABSTRACT</b> UL	

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)  
Prescribed by ANSI Std. Z39-18  
298-102



# DELAWARE STATE UNIVERSITY

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DEPARTMENT OF CHEMISTRY

March 6, 2000

AFOSR/PKC

801 N. Randolph St. Room 732

Arlington, VA 22203-1977

The acquisition of state-of-the-art inert atmosphere laboratory facilities has strengthened the physical science program at Delaware State University (DSU), a historically black institution. The goal of the proposal was to strengthen existing research programs at DSU and provide underrepresented student populations with necessary skills and knowledge to succeed at their future endeavors.

The grant award provided DSU with a Vacuum/Atmospheres NX1-21000 system. The NX1-21000 is a high-performance constant atmosphere Dri-Lab System with fully integrated and modular capabilities for the manipulation of air-sensitive materials. The essential element of the NX1-21000 is the universally accepted design that has proven to be extremely versatile and reliable. This design strategy centers on providing unequalled dry chamber stability and control at the same time highly adaptable to efficiently meet the specific needs of independent research programs. The Dri-Lab System's hardware features are controlled by a Nexus One system control unit that utilizes advanced computer technology to provide a simple-to-use with proven reliability, easy maintenance and user safety. The resulting design presents a user-friendly menu driven interface for entering all information and to initiate all available programmed operations. These technological advances in dry box design provide researchers at DSU with safety features not available on traditional instruments with manual operative devices.

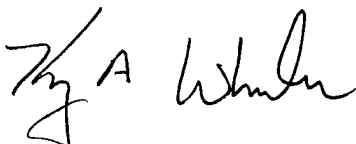
Additionally, residual funds from the grant award were AFOSR approved and applied towards the acquisition of electrochemical instrumentation to support the PI's current research efforts. This equipment included a computer-controlled bi-potentiostat, rotator, and electrodes obtained from the Pine Instrument Company. The combination of the constant atmosphere dry box and electrochemical equipment allows the PI's research group to conduct studies on Li-cell battery applications. Installation of the above described instrumentation was completed during the fall of 1998 and regular use of the thereafter.

Delaware State University is committed to enhancing the quality of teaching at the institution. These facilities have provided students with a knowledge base and experience in inert atmosphere sample manipulations not previously feasible at DSU. In the last year, this instrumentation has resulted in the recognition of student supported research activities. The following citations are references to publications resulting from this award in the last year.

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- "Electrolyte Optimization", Exploratory Technology Research Program Review, Berkeley, CA, June 1999. K.A. Wheeler.
- "Aluminum Deposition and Nucleation on Nitrogen-Incorporated Tetrahedral Amorphous Carbon Electrodes in Ambient Temperature Chloroaluminate Melts," *J. Electro. Chem.* Submitted, J.-J. Lee, B. Miller, X. Shi, R. Kalish, and K. A. Wheeler.

The newly acquired inert atmosphere and electrochemical facilities at Delaware State University enhance the current instrumentation and research programs at the institution. DSU believes that the AFOSR grant has improved the quality of instruction and research capabilities at the institution.

A handwritten signature in black ink, appearing to read "K A Wheeler". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Kraig A. Wheeler  
Associate Professor of Chemistry  
Delaware State University